

ORIGINAL RESEARCH

Clinical Outcome of Isolated Tricuspid Regurgitation



Yan Topilsky, MD,* Vuyisile T. Nkomo, MD,† Ori Vatury, MD,‡ Hector I. Michelena, MD,‡ Thierry Letourneau, MD,‡ Rakesh M. Suri, MD, DPHIL,‡ Sorin Pislaru, MD,‡ Soon Park, MD,‡ Douglas W. Mahoney, MSc,§ Simon Biner, MD,* Maurice Enriquez-Sarano, MD†

ABSTRACT

OBJECTIVES The aim of this study was to assess the outcome of isolated tricuspid regurgitation (TR) and the added value of quantitative evaluation of its severity.

BACKGROUND TR is of uncertain clinical outcome due to confounding comorbidities. Isolated TR (without significant comorbidities, structural valve disease, significant pulmonary artery systolic pressure elevation by Doppler, or overt cardiac cause) is of unknown clinical outcome.

METHODS In patients with isolated TR assessed both qualitatively and quantitatively by a proximal isovelocity surface area method, a long-term outcome analysis was conducted. Patients with severe comorbid diseases were excluded.

RESULTS The study involved 353 patients with isolated TR (age 70 years; 33% male; ejection fraction, 63%; all with right ventricular systolic pressure <50 mm Hg). Severe isolated TR was diagnosed in 76 patients (21.5%) qualitatively and 68 patients (19.3%) by quantitative criteria (effective regurgitant orifice [ERO] ≥ 40 mm²). The 10-year survival and cardiac event rates were $63 \pm 5\%$ and $29 \pm 5\%$. Severe isolated TR independently predicted higher mortality (adjusted hazard ratio: 1.78 [95% confidence interval (CI): 1.10 to 2.82], $p = 0.02$ for qualitative definition and 2.67 [95% CI: 1.66 to 4.23] for an ERO ≥ 40 mm², $p < 0.0001$). The addition of grading by quantitative criteria in nested models eliminated the significance of the qualitative grading and improved the model prediction ($p < 0.001$ for survival and $p = 0.02$ for cardiac events). The 10-year survival rate was lower with an ERO ≥ 40 mm² versus < 40 mm² ($38 \pm 7\%$ vs. $70 \pm 6\%$; $p < 0.0001$), independent of all characteristics, right ventricular size or function, comorbidity, or pulmonary pressure ($p < 0.0001$ for all), and lower than expected in the general population ($p < 0.001$). Freedom from cardiac events was lower with an ERO ≥ 40 mm² versus < 40 mm² independently of all characteristics, right ventricular size or function, comorbidity, or pulmonary pressure ($p < 0.0001$ for all). Cardiac surgery for severe isolated TR was rarely performed ($16 \pm 5\%$ 5 years after diagnosis).

CONCLUSIONS Isolated TR can be severe and is associated with excess mortality and morbidity, warranting heightened attention to diagnosis and quantitation. Quantitative assessment of TR, particularly ERO measurement, is a powerful independent predictor of outcome, superior to standard qualitative assessment. (J Am Coll Cardiol Img 2014;7:1185–94)
© 2014 by the American College of Cardiology Foundation.

From the *Division of Cardiovascular Diseases and Internal Medicine, Tel Aviv Medical Center, Tel Aviv, Israel; †Division of Cardiovascular Diseases and Internal Medicine, Mayo College of Medicine, Mayo Clinic, Rochester, Minnesota; ‡Division of Cardiovascular Surgery, Mayo College of Medicine, Mayo Clinic, Rochester, Minnesota; and the §Department of Health Science Research, Mayo College of Medicine, Mayo Clinic, Rochester, Minnesota. Dr. Suri is a national principal investigator for the Sorin-Perceval Trial 2; is the co-principal investigator for the Abbott COAPT trial 3 and COAPT trial; is a Clinical Steering Committee of the St. Jude Medical Portico Trial; has patent applications with Sorin Perceval Trial and Sorin; and has received research support from Sorin, Abbott, St. Jude Medical, and Edwards Lifesciences. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received March 20, 2014; revised manuscript received July 22, 2014, accepted July 24, 2014.

ABBREVIATIONS AND ACRONYMS

ERO = effective regurgitant orifice

RV = right ventricular

SPAP = systolic pulmonary artery pressure

TR = tricuspid regurgitation

Tricuspid regurgitation (TR) is frequent (1) but poorly defined. Management guidelines remain vague (2) due to a paucity of outcome studies and their contradictory results (3-6). Studies of TR are influenced by outcome interference of numerous comorbidities, pulmonary hypertension, left-sided heart disease, and background conditions (4,7,8) that obscure the specific significance of TR (9). Thus, it is generally uncertain whether TR independently affects outcome or is a surrogate for associated conditions. Other sources of uncertainty are the imprecision of standard assessment of TR (10) and the ambiguity of guidelines in defining severe TR (11). Hence, clinical guidelines propose very limited indications for tricuspid valve surgery unless there is another surgical indication such as severe mitral valve diseases (2).

SEE PAGE 1195

In trying to resolve this conundrum, we assessed patients with isolated functional TR, excluding major comorbidities affecting TR outcome (9,12-14) and with TR quantitative assessment (11,15,16). We aimed to evaluate clinical outcome of isolated TR, define whether severe isolated TR is associated with excess mortality and cardiac events, and analyze the role of TR quantitative assessment in predicting TR outcome.

METHODS

DEFINITION OF ISOLATED TR. Isolated TR diagnosis required the following: 1) TR holosystolic and functional; 2) no likely pulmonary hypertension (<50 mm Hg) (17); 3) no overt TR cause (no intrinsic tricuspid disease, left ventricular ejection fraction $\geq 50\%$, no pacemaker/defibrillator wire across the tricuspid, no other valve disease more than mild, no disease that may cause TR, no congenital or pericardial heart disease); and 4) no previous valve surgery.

STUDY DESIGN. We initiated a prospective program of TR quantitation enrolling patients with mild or greater holosystolic TR by visual assessment. The final population was selected retrospectively as patients with isolated TR and TR quantitation performed from 1995 to 2005. Patients with severe comorbid conditions, including cancer, severe lung disease, cirrhosis, recent myocardial infarction (<3 months), or end-stage renal disease at presentation were excluded. Isolated quantified mild to severe TR represented 12.2% of our quantified population. We also identified 1,972 patients with trivial isolated TR (jet area ≤ 1.0 cm²; an effective regurgitant orifice

[ERO] of 0) evaluated by the principal investigator, during the same period, with same inclusion criteria and same methods. To examine the hypothesis that isolated TR of increasing quantified degree is associated with worse outcome consequences, a frequency-matching approach was used in which patients with trivial isolated TR were randomly selected from the desired bin of all patients with trivial isolated TR, achieving groups of patients with trivial and mild to severe quantified TR comparable in terms of other independent determinants of outcome but with no set couples of matched patients and unequal size. The predefined baseline computerized matching parameters were age (within 10 years), ejection fraction (within 5%), exact year of diagnosis, atrial fibrillation, and sex.

Outcome was analyzed from an echocardiographic diagnosis until death or last follow-up up to 2010.

The study was powered (80%, $p = 0.05$) to detect $\geq 30\%$ mortality difference between severe and lesser degrees of isolated TR. The study was institutional review board approved.

BASELINE CLINICAL ASSESSMENT AND MANAGEMENT.

Patient symptoms, physical examination, and comorbid conditions (Charlson age-adjusted comorbidity index [18]) were evaluated by Mayo personal physicians. Congestive heart failure was diagnosed by Framingham criteria (19). Clinical management was determined by personal physicians.

FOLLOW-UP AND OUTCOMES. Clinical follow-up was obtained by review of medical records, surveys, and telephone interviews. The cause of death was determined by medical records and death certificates. Events used as endpoints were mortality and cardiovascular events under medical management. Cardiovascular events comprised cardiac death including sudden death (20) and congestive heart failure but not death due to other causes.

DOPPLER ECHOCARDIOGRAPHY. All measurements were averages of inspiratory and expiratory (21) over ≥ 5 cardiac cycles (22,23). Right ventricular (RV) size and systolic function were qualitatively graded (on a scale of 1 to 4). RV function assessment was on the basis of multiple views of the right ventricle (short-axis parasternal at basal, mid, and apical levels; lower parasternal RV inflow view; apical 4-chamber view; and, if possible, RV long-axis view and subcostal short- and 4-chamber views). Using these multiple views, integrative qualitative grading was formulated by the physician responsible for the echocardiogram. Qualitative TR assessment used jet size, vena contracta (24), and hepatic venous reversal using recent American Society of Echocardiography

Download English Version:

<https://daneshyari.com/en/article/2938014>

Download Persian Version:

<https://daneshyari.com/article/2938014>

[Daneshyari.com](https://daneshyari.com)